

**CLAIMS**

What is claimed is:

1. A porous carbon body having an electronically conductive hydrophilic agent for use in an electrochemical cell, the body comprising:

- 5           a. an electronically conductive graphite powder in an amount of between 67% - 87% by weight of the body;
- b. a thermoset binder in an amount of between 6% - 18% by weight of the body; and,
- 10          c. a modified carbon black electronically conductive hydrophilic agent in an amount of between 2% - 20% by weight of the body, the modified carbon black being carbon having attached at least one organic group, the organic group comprising i.) at least one aromatic group or a C<sub>1</sub>-C<sub>12</sub> alkyl group, and ii.) at least one ionic group, one ionizable group, or a mixture of an ionic group and an ionizable group wherein the ionic or the ionizable group is a sulfonic acid or a salt thereof, wherein the at least one aromatic group or C<sub>1</sub>-C<sub>12</sub> alkyl of the organic group is directly 15 attached to the carbon, and the organic group is present at a level of from about 0.10 to about 4.0 micromoles/m<sup>2</sup> of the carbon used based on the nitrogen surface area of the carbon.
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2. The porous carbon body of Claim 1, wherein the body has a mean pore size of greater than 2.0 microns, and an open porosity of greater than 25% of the body.

3. The porous carbon body of Claim 1, wherein the body has a bubble pressure of greater than 5 pounds per square inch.

4. The porous carbon body of Claim 1, wherein the thermoset binder is a thermoset binder selected from the group consisting of a phenolic resin, a vinyl ester resin, an epoxy resin, a diallylphthalate resin, and a urethane resin.

5. The porous carbon body of Claim 1, wherein the pores of the body are sufficiently hydrophilic to wick fill to greater than 70% of a vacuum filled level.

6. A porous carbon body having an electronically conductive hydrophilic agent for use in an electrochemical cell comprising:

- a. an electronically conductive graphite powder in an amount of between 60% - 80% by weight of the body;
- b. a carbon fiber in an amount of between 5% - 15% of the body;
- c. a thermoset binder in an amount of between 6% - 18% by weight of the body;
- d. a modified carbon black electronically conductive hydrophilic agent in an amount of between 2% - 20% by weight of the body, the modified carbon black being carbon having attached at least one organic group, the organic group comprising i.) at least one aromatic group or a  $C_1$ - $C_{12}$  alkyl group, and ii.) at least one ionic group, one ionizable group, or a mixture of an ionic group and an ionizable group wherein the ionic or the ionizable group is a sulfonic acid or a salt thereof, wherein the at least one aromatic group

25 or C<sub>1</sub>-C<sub>12</sub> alkyl of the organic group is directly attached to the carbon, and the organic group is present at a level of from about 0.10 to about 4.0 micromoles/m<sup>2</sup> of the carbon used based on the nitrogen surface area of the carbon.

7. The porous carbon body of Claim 6 wherein the body has a mean pore size of greater than 2.0 microns, and an open porosity of greater than 25% of the body.

8. The porous carbon body of Claim 6, wherein the body has a bubble pressure of greater than 5 pounds per square inch.

9. The porous carbon body of Claim 6, wherein the thermoset binder is a thermoset binder selected from the group consisting of a phenolic resin, a vinyl ester resin, an epoxy resin, a diallylphthalate resin, and a urethane resin.

10. The porous carbon body of Claim 6, wherein the pores of the body are sufficiently hydrophilic to wick fill to greater than 70% of a vacuum filled level.

11. A method of forming a porous carbon body having an electronically conductive hydrophilic agent for use in an electrochemical cell, the method comprising the steps of:

- 5 a. mixing together an electronically conductive graphite powder in an amount of between 67% - 87% by weight of the mixture, a thermoset binder in an amount of between 6% - 18% by weight of the mixture, and a modified carbon black electronically conductive hydrophilic agent in a  
10 amount of between 2% and 20% by weight of the mixture, the modified carbon black being carbon

having attached at least one organic group, the organic group comprising i.) at least one aromatic group or a C<sub>1</sub>-C<sub>12</sub> alkyl group, and ii.) at least one ionic group, one ionizable group, or a mixture of an ionic group and an ionizable group wherein the ionic or the ionizable group is a sulfonic acid or a salt thereof, wherein the at least one aromatic group or C<sub>1</sub>-C<sub>12</sub> alkyl of the organic group is directly attached to the carbon, and the organic group is present at a level of from about 0.10 to about 4.0 micromoles/m<sup>2</sup> of the carbon used based on the nitrogen surface area of the carbon; and,

b. then simultaneously compressing and heating the mixture in a mold at a pressure of between 250 - 1,000 pounds per square inch and at a temperature of between 300 - 450 degrees Fahrenheit to form a body having a mean pore size of greater than 2.0 microns and an open porosity of greater than 25%.

12. The method of Claim 9, wherein the mixing together step further comprises mixing with the electronically conductive graphite powder, thermoset binder, and modified carbon black, a carbon fiber in an amount of between 5% - 15% by weight of the mixture.